PRE-CONDITIONED SOLUTE FOR USE IN CRYOGENIC PROCESSES

ABSTRACT OF THE DISCLOSURE

Embodiments of the present invention disclose methods for producing pre-conditioned solutes that exhibit no temperature spike during super-cooling in a cryogenic process. In addition, the solutes demonstrate utile capabilities and characteristics such as more efficient heat absorption rates and eutectic material properties which make the pre-conditioned solutes an efficient heat exchange medium. The methods involve super-cooling a solute to induce a long-duration phase change capability. The pre-conditioned solute may be thawed and will retain long-duration phase change capabilities for subsequent freezing cycles if the freezing protocols disclosed herein are followed. Material to be frozen may be directly immersed into pre-conditioned, super-cooled solutes for freezing. The solute may be propylene glycol, glycerol, or other suitable solutes.